Lesson 8 - Proteins In The Diet

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1. Introduction

The role of protein in the diet is often an emotional issue. If you wish to confirm this, try to take a steak away from a meat-eater. "But I need my *protein*" he cries. Tell your friends you are a vegetarian. They may look worried, disturbed—"Where do you get your *protein*?" they ask, as if you might drop dead at any time.

Perhaps never have so many been so confused over a subject about which they know so little. Much of the information the general public receives about protein comes from special interest groups such as the meat-packing and dairy industries. Consequently, the average person believes that eating large quantities of meat, eggs, milk, cheese, etc., is desirable. They may be full of poisons; they may cause cancer: they may cause heart disease—but, they all furnish that magical substance called protein.

If we are to separate emotion from reason, and propaganda from facts, we must educate ourselves about the true need of the body for protein. We must discover how much protein we actually need, how we can best get it and, after all, just what it is.

2. Why We Need Protein

Protein is needed by the body for only two reasons: I) growth and 2) tissue repair and replacement. Protein is not necessary for muscular energy, increased activity or as a source of fuel.

2.1 Growth and Tissue Repair

Proteins support normal growth and maintenance of the body tissues.

2.2 Growth

Perhaps the role of protein in growth is best exemplified in the development of babies and newborn animals. A relatively high amount of protein is found in the milk of lactating mothers to insure healthy tissue growth in the young child. The protein needs are highest when growth is the fastest. For instance, compare the protein content in mother's milk after the first six months of birth:

Time After Birth	**Percent Protein**
From the 8th to 11th day	2.38
From the 20th to 40th day	1.79
From the 70th to 120th day	1.49
At the 170th day and later	1.07

Notice that the highest protein contents occur during the earliest stages of growth to allow for rapid development of the baby. As the growth of the child begins to slow, so does the protein content found in the mother's milk. It is also interesting to note that the percentage of protein found in mother's milk is approximately the same as the protein content of most fruits and vegetables. For example, grapes have a 1.3% protein content, raspberries 1.5%, dates 2.2% and so on.

We can also find a relationship between the protein content of the milk of lactating animals and the growth rate of their young by studying the following chart:

	Number of Days for Newborn to Double Its Weight	**Average Protein Percentage In Mother's Milk**
Man	180	1.6
Horse	60	2.0
Calf	47	3.5
Kid	19	4.3
Pig	18	5.9
Lamb	10	6.5
Dog	8	7.1

Cat	7	9.5

The highest need for protein in the diet occurs for most animals during the above periods when the newborn is doubling its birth weight. It is important that we realize the protein content in mother's milk, the optimum food nature has provided for rapid growth of the young, is far below the usual foods that are recommended because of their high protein content (such as meat, nuts, legumes, grains, etc.). Protein is indeed important for growth, but we might well question the alleged necessity for concentrated, high-protein foods.

2.3 Tissue Repair and Replacement

The second role of protein is in the repair of tissues or replacement of worn-out cells. After an organism reaches its full growth (usually between 18 and 22 years for humans), protein is needed only to supply the loss incidental to tissue waste. Cell degeneration and waste occur primarily because of toxicity in the body. If we adopt a lifestyle and diet that introduce a minimal amount of toxins into the body, then tissue waste will decrease significantly. As a result, actual protein needs will also diminish.

After an individual reaches adulthood, the only protein needs are for the repair and replacement of tissues that have deteriorated, due largely to body toxicity.

2.4 Not As A Fuel Source

Protein is not used directly as fuel for the body or for muscular activity. In muscular work, excretion of nitrogen as a result of protein usage increases only very slightly. Instead, it is the excretion of carbonic acid and absorption of oxygen that increase. These changes indicate that an expenditure of energy is derived mainly from non-nitrogenous foods (such as carbohydrates and fats) and not, from protein.

It is true that the body can use protein to generate fuel for physical activity, but it does so by breaking the protein down into a carbohydrate form. Protein is used as fuel only when there is either an excess of proteins or a lack of carbohydrates. When this occurs, the body splits off the nitrogenous matter from the protein molecule and uses the remaining carbon contents to produce fuel. This process not only involves a net loss of energy, but it also places an unnecessary strain on the liver, kidneys and other organs to eliminate the unusable nitrogenous wastes.

It is for this reason that the popular high-protein, low-carbohydrate diets result in weight loss and also why they are dangerous. Since the body has to expend so much energy in converting the excess protein into the needed carbohydrates for fuel, a net loss occurs in the body and the dieter loses weight. At the same time, he also places a heavy burden on his kidneys to eliminate all the uric acid generated by this protein breakdown and simultaneously overworks an already exhausted liver.

If more physical activity is anticipated, it is only necessary to increase the carbohydrate intake of the diet. Proteins are very poor in fuel-efficiency and do not aid directly or efficiently in muscular activity.

3. How Much Protein Do We Need?

No other area of nutritional needs has been surrounded by so much controversy as the daily protein requirements. Nutritionists and scientists have made protein allowance recommendations that have varied as much as 600%. To arrive at a realistic estimate of our protein needs, we first need to understand how some of the current protein standards were derived. We then need to study the actual protein intake requirements of healthy human beings following a traditional diet that has been in effect over several generations. In this manner, we can see how many of the protein allowances today have been inflated beyond normal health needs.

3.1 Background of Current Protein Recommendations

In the late nineteenth century. Baron von Liebig was the first person to separate foods into proteins (nitrogenous substances) and carbohydrates/fats (non-nitrogenous substances). Since the muscles are composed chiefly of protein. Liebig concluded (incorrectly) that proteins supply muscular energy and the amount of protein consumed must be related to bodily activity. In fact, it is actually the non-nitrogenous foods that supply the best fuel for muscular activity.

Liebig was one of the first scientists to make a recommendation for protein intake. He determined the body's protein requirements by measuring the actual amounts of protein consumed by a group of men engaged in physical activity who ate a heavy diet. He reasoned that by measuring the protein intake of men who ate more than average and worked harder than usual, he could arrive at a safe recommended allowance of protein for all people. Such a technique for establishing a standard is somewhat akin to clocking race car drivers in order to establish a safe speed for schoolzones.

Anyway, based on this experiment Liebig determined that about 120 grams of protein daily would satisfy the needs of a moderately active adult. To obtain 120 grams of protein, a person would need to consume about 17 eggs or a pound and a half of meat or twenty ounces of almonds per day.

Following Liebig, Voit in 1881 performed a series of experiments on dogs and likewise determined that we should consume between 100 and 125 grams of protein a day. Doubtless, dogs can safely consume 125 grams of protein per day. The protein requirement for a growing puppy is five times as great as that for a growing baby. Voit, unfortunately, did not adjust his results to account for the differences between humans and dogs.

From the very beginning, we can see that protein requirements were artificially determined and excessively high. As early as 1887, experiments in Germany showed that 40 grams of protein was a sufficient daily amount about one-third of the current recommendations. The old standards of Liebig and Voit, however, were already firmly fixed in the minds of the medical establishment, and the belief persisted that a high-protein diet was conducive to health anyway, so why lower the recommendations?

After many more experiments proved that a daily protein intake of 30 to 40 grams was entirely sufficient, the establishment finally revised its recommendations down to 60 or 70 grams. Although only one-half of the early estimates, this figure is 50% too high, even by conservative nutritional standards. Today, with the support of the meat, dairy and egg industries, the protein allowances still remain around 70 grams per day. It should also be noted that a typical American meat-eater consumes about 93 grams of protein daily—more than anyone else in the world on the average.

3.2 True Protein Needs

Perhaps a more reasonable way of establishing true protein needs is to study the daily protein intake of groups of people who: 1) maintain a reasonable level of good health and 2) have followed a traditional diet over a long period of time. Even this method tells us little about what amount of protein a person

must have, but it is an interesting case study that probably has more validity than laboratory experiments on dogs, etc.

For instance, in Japan there are farming districts where dietary habits have been established for hundreds of years (unlike most Western diets which have fluctuated and changed rapidly over the past eighty years or so). In these districts, a primarily vegetarian diet was followed, consisting of many greens, plums, wild fruits, roots and occasionally fish in small amounts. These farmers were in excellent health and performed heavy manual labor all through the day. They consumed an average of 37 grams of protein per day, about half the official recommendation.

On various islands in the Pacific are tribes of people who have followed the same diet for dozens of generations—fruits, roots and tubers. They enjoy excellent health and consume about 15 grams of protein a day.

Finally, a study was done by Dr. Jaffe of the University of California at Berkeley on the effects of a non-meat diet over several generations. He studied several generations of fruitarians, ranging from young children to adults whose diet consisted principally of all raw fruits, supplemented by occasional nuts and some honey. Their diets supplied them with about 24 to 33 grams of protein a day. None exhibited any signs of protein deficiency, nor of any other nutrient deficiency. In fact, he discovered all of them to be in exceptional health.

Obviously, if large groups of people around the world are existing in good health on 15 to 35 grams of protein a day, and have done so over several generations and hundreds of years, then protein recommendations of 70 grams can only be deemed excessive.

During the last sixty years, several researchers (Rose, Boyd, Berg, et al) all independently proved that between 3.7% and 4.65% of the total food intake was all the protein necessary to maintain good health. These percentages are equivalent to about 24 to 30 grams of protein.

Careful investigations by Dr. Max Rubner, director of the Hygienic Institute of the University of Berlin, showed that only 4% of the entire caloric intake had to be in the form of protein. On a 2,500 calorie diet, this is about 100 calories of protein or about 28 grams.

Although Natural Hygiene and Life Science do not endorse gram-counting, calorie-counting or a preoccupation with minimal daily requirements, it seems that a reasonable estimate of the protein needs of an adult is probably in the 25 to 30 grams daily range — or about 1 gram per five pounds of body weight. If a person eats a varied diet of fruits, vegetables, nuts, seeds and sprouts, he is assured that he will meet this protein requirement, along with all the other nutrient needs.

3.3 Excessive Protein Is Harmful

It is important that we have a realistic idea of the body's true protein needs because of the damage that may occur when we eat far beyond those needs. Almost every American consumes an excessive amount of protein, even by highly-inflated government standards. A protein-deficient diet is rare in this country, although nutrient-poor diets are the norm. Protein poisoning from an excessive amount of protein is more common than a true deficiency.

When protein is consumed in greater amounts than can be processed by the body, toxicity results from the excessive amount of nitrogen in the blood. This extra nitrogen accumulates as kinotoxin in the muscles and causes chronic fatigue.

Proteinosis, or acute protein poisoning, causes headaches and a general aching. Various symptoms of protein poisoning, such as a burning of the mouth, lips and throat, rashes, etc., are very similar to the symptoms attributed to allergies. In fact, many so-called allergies may be cases of protein poisoning instead.

A high-protein diet eventually destroys the entire glandular system. It overworks the liver and places a

heavy strain on the adrenals and kidneys to eliminate the toxins it creates. In many people, symptoms of arthritis have disappeared after they adopted a low-protein diet.

3.4 Protein Supplements are Harmful

It is for these and other reasons that protein supplements should never be used. Protein supplements, by supplying the body with an excessive amount of nitrogen, throw it out of balance and can actually contribute to other nutritional deficiencies. The body must try to eliminate the protein it cannot use that is found in these supplements, and an additional burden is placed on the body.

Also, protein supplements are made from fragmented foods such as soy powder, dried egg whites, powdered milk, etc. When foods are eaten in a processed and fragmented state, they tend to oversupply the body with some nutrients while creating a deficiency of other nutrients. Consequently, protein supplements, besides supplying an excessive and harmful amount of protein, also disrupt the body's nutritional balance.

Brewers yeast, a popular high-protein supplement, contributes to uric acid formation in the body. It is a waste product of the brewing industry, resulting when the barley is turned into malt. The industry then has no use for it. It is a "dead" food, because it's heated before marketing to destroy the yeast organisms. Dried egg whites result in constipation; soy powders have enzymes which actually inhibit the absorption of some of the amino acids; using powdered milk results in the formation of mucus (to aid in its removal from the body), and so on. All of these commonly-used protein supplements will be discussed in later lessons. None of them is ever necessary and they should never be included in the diet.

4. What Are Proteins?

We know now why we need protein in our diet, but what actually is protein? If you ask the average person what is the first thing that comes into his mind when you say "protein," he will most likely respond with "meat." Is protein simply meat or eggs or nuts?

Protein is one of the three categories for all foods, the other two being carbohydrates and fats. Proteins are highly complex compounds of carbon, hydrogen, nitrogen, oxygen and small amounts of sulphur or iodine. They are present in the protoplasm of every living cell and are involved in every organic activity of an organism.

4.1 Principal Proteins and Their Chemical Compositions

There are many different types of proteins within the bodies of animals and plants. For example, all plants have at least two different types of protein, and within the human body are over 100,000 different kinds of proteins. Although all of these proteins differ in their molecular structure, they all have approximately the same chemical composition of 53% carbon, 22% oxygen, 17% nitrogen, 7% hydrogen and 1% sulphur, iodine, etc.

The principal vegetable proteins are *albumin* (found in fruits and vegetables), *gluten* (in wheat and cereals), *legumin* (in peas and beans), *globulin* (in nuts) and *mucleo-protein* (in peas and beans), *globulin* (in nuts) and *muco-protein* (in seeds). Some of the animal proteins are *casein* (found in milk and dairy products), *gelatin* (in bones and tendons), *fibrin* (in blood) and *myosin* (in the flesh of animals).

All of these proteins are composed of amino acids. An amino acid is simply a substructure of a protein compound. You can think of protein as being chains of amino acids that are linked together to form one structure.

For example, a protein compound known as globulin exists in pumpkin seeds. It is composed of the following elements:

Element	Number of Atoms in the Molecule
Carbon	292
Hydrogen	481
Nitrogen	90
Oxygen	83
Sulphur	2

Within this globulin protein molecule are chains of amino acids that make up the compound.

In the following example, an amino acid called isoleucine is contained within this protein molecule. It is composed of the following elements:

Element	Number of Atoms in the Amino Acid
Carbon	6
Hydrogen	13
Nitrogen	1
Oxygen	2

4.2 Amino Acids Are the Building Blocks

You can see that many amino acids are necessary to form one protein compound. In many cases, several different types of amino acids are in the same protein molecule. It is these amino acids that are important to the body, and this is what the body uses protein for.

When you hear the word "protein" now, you should think of "amino acids."

5. The Importance Of Amino Acids

Many different proteins are known, but all of them are constructed from 23 principal amino acids. These amino acids are the building blocks of all vegetable and animal protein. A molecule of protein may contain as many as several hundred or even thousands of these amino acids. These amino acids are linked together within the protein molecule in a unique fashion known as peptide linkage. A specific protein contains a variety of amino acids linked together in a sequence specific to that protein.

The body cannot use or assimilate protein in its original state as eaten. The protein must first be digested and split into its component amino acids. The body can then use these amino acids to construct the protein it needs. The ultimate value of a food protein, then, lies in its amino acid composition. It is the amino acids that are the essential nutrients. The proper study of the role of protein in nutrition can only be done with a thorough understanding of the amino acids.

5.1 Sources of Amino Acids

5.1.1 Exogenous Protein

Amino acids are the end products of protein digestion. When protein is eaten, enzymes in the stomach and small intestine begin to break the linkages within the protein molecule and produce shorter and shorter chains of amino acids. Eventually, the amino acids are in a simplified enough chemical form so that they can pass through the intestinal walls into the bloodstream. They are then carried by the portal vein to the liver for elaboration and passed on to the blood, lymph and cells. The cells synthesize the amino acids into proteins as required.

This simplified description of the digestion and assimilation of protein applies to *exogenous protein*. Exogenous protein is the term for protein obtained through the diet or from outside of the body.

5.1.2 Endogenous Protein

Protein may also be obtained from *within* the body. This is called *endogenous protein*. Endogenous protein does not come directly from the foods we eat, but from the synthesis of proteins from within the body.

Obtaining protein from the diet is common knowledge. The fact that the body can synthesize protein from its own proteinaceous wastes, however, is not widely known.

As the body's cells undergo their natural catabolic processes, they produce proteinaceous wastes in the form of spent cells and other by-products of their own metabolism. These proteinaceous products enter the lymph fluid.

Other cells in the body are able to ingest these spent proteins and to digest them in vesicles ("stomachs") of their own formation. The body's cells are thus able to break these proteinaceous wastes down into amino acids and use them to synthesize their own protein.

Endogenous protein (or protein from within the body) is an important source of amino acids that is often overlooked by conventional nutrition writers. Many times, up to two-thirds of the body's total protein needs are supplied through endogenous protein and not from exogenous dietary sources.

5.2 The Amino Acid Pool

From the digestion of proteins in the diet and from the recycling of proteinaceous wastes, the body has all the different amino acids circulating in the blood and lymphatic system. When cells need these amino

acids, they appropriate them from the blood or lymph. This continually-circulating available supply of amino acids is known as the *amino acid pool*.

The amino acid pool is like a bank that is open twenty-four hours. The liver and the cells are continually making deposits and withdrawals of amino acids, depending upon the concentration of amino acids in the blood.

When the number of amino acids is high, the liver absorbs and stores them until needed. As the amino acid level in the blood falls due to withdrawals by the cells, the liver deposits some of the stored amino acids back into circulation.

The cells also have the capacity to store amino acids. If the amino acid content of the blood falls or if some other cells require specific amino acids, the cells are able to release their stored amino acids into circulation. Since most of the body's cells synthesize more proteins than are necessary to support the life of the cell, the cells can reconvert their proteins into amino acids and make deposits into the amino acid pool.

Between the deposits and withdrawals by the liver and cells, there is a continual flux of amino acids in the blood and plasma. This circulating source of amino acids, as well as the potential availability of the amino acids stored within the liver and the cells, makes up the important amino acid pool. This pool of amino acids is very important in understanding why complete proteins are not necessary in the diet and will be discussed later in this lesson.

5.3 The Specific Amino Acids and Their Functions

5.3.1 Specific Amino Acids—Descriptions and Sources

The following descriptions of the amino acids include their most important functions and some of the food sources in which they are found.

ALANINE — Is a factor in regulating the adrenal glands and insuring healthy skin, particularly the scalp. It is found in almonds, alfalfa sprouts, apples, apricots, avocadoes, carrots, celery, cucumbers, grapes, lettuces, oranges, strawberries, sweet peppers and tomatoes.

ARGININE — Is used in muscle contraction and the construction of cartilage. It is essential in the functioning of the reproductive organs and in controlling the degeneration of the body cells. Arginine is found in alfalfa sprouts, beets, carrots, celery, cucumbers, lettuces, parsnips, potatoes and turnips.

ASPARTIC ACID — Is used in cardiovascular functions and in the retarding of tooth and bone destruction. It is found in almonds, apples, apricots, carrots, celery, cucumbers, grapefruits, lemons, pineapples, tomatoes and watermelons.

CYSTINE — Is used in the formation of red blood corpuscles and is involved in hair growth and the functioning of the mammary glands. It is found in alfalfa sprouts, apples, brazil nuts, beets, brussels sprouts, cabbages, carrots, currants, cauliflower, filberts, kale, pineapples and raspberries.

GLUTAMIC ACID — Is used in maintaining blood-sugar levels. Anemia will not occur if this and other nutrients are obtained and used. Glutamic acid is also a factor in the secretion of gastric juices. It is found in brussels sprouts cabbages, carrots, celery, green beans, lettuces and papayas

GLYCINE — Is a factor in forming muscle fiber and cartilage and in regulating sex hormones. It is found in alfalfa sprouts, almonds, carrots, celery, okra, oranges, potatoes, pomegranates, raspberries, turnips and water melons.

HISTIDINE — Is used in manufacturing glycogen and in the control of mucus. It is a component of hemoglobin and semen. It is found in alfalfa sprouts, applet, beets, carrots, celery, cucumbers, endive, papayas, pineapples and pomegranates.

HYDROXYGLUTAMIC ACID — Is similar to glutamic acid and is a factor in controlling digestive juices. It is found in carrots, celery, grapes, lettuces, plums, raspberries and tomatoes.

HYDROXYPROLINE — Aids in liver and gallbladder functions, in emulsifying fats and in the formation of red blood corpuscles. It is found in almonds, apricots, avocadoes, brazil nuts, beets, carrots, cherries, cucumbers, coconuts, figs, grapes, lettuces, oranges, pineapples and raisins.

IODOGORGOIC ACID — Is a factor in all glandular functions. It is found in carrots, celery, lettuces, pineapples and tomatoes.

ISOLEUCINE — Aids in the regulation of the thymus, spleen, pituitary and the metabolism. It is also a factor in forming hemoglobin, lsoleucine is found in .avocadoes, coconuts, papayas, sunflower seeds and almost all nuts.

LEUCINE — Counterbalances the isoleucine amino acid and is found in the same food sources.

LYSINE — Aids in the functions of the liver, gallbladder and pineal and mammary glands. It is also a factor in fat metabolism and in preventing cell degeneration. Lysine is found in alfalfa sprouts, apples, apricots, beets, carrots, celery, cucumbers, grapes, papayas, pears and soybean sprouts.

METHIONINE — Aids in the functioning of the spleen, pancreas and lymph glands. It is a constituent of hemoglobin and tissues and is found in apples, brazil nuts, cabbages, cauliflower, filberts, kale and pineapples.

NORLEUC1NE — Balances the functions of leucine. Synthesized within the body if needed.

PHENYLALANINE — Is involved in the functions of the kidneys and bladder and in eliminating wastes. It is found in apples, beets, carrots, pineapples and tomatoes.

PROLINE — Involved in manufacturing white corpuscles and in the emulsifying of fats. It is found in apricots, avocadoes. almonds, beets, brazil nuts, carrots, cherries, coconuts, cucumbers, figs, grapes, oranges, pineapples and raisins.

SERINE — Aids in the tissue cleansing of the mucus membrane and in the lungs and bronchial. It is found in alfalfa sprouts, apples, beets, carrots, celery, cucumbers, cabbages, papayas and pineapples.

THREONINE — Aids in the balancing of amino acids. Threonine is found in alfalfa sprouts, carrots, green leafy vegetables and papayas.

THYROXINE — Involved with the activity of the thyroid, pituitary and adrenals and in metabolic functions. It is found in carrots, celery, lettuces, tomatoes and pineapples.

TRYPTOPHANE— Involved in the generation of cells and tissues and in the pancreatic and gastric juices. Tryptophane is also a factor in the optic system. It is found in alfalfa sprouts, beets, carrots, celery, green beans and turnips.

TYROSINE — Is a factor in the development of the cells and tissues and in the generation of red and white blood corpuscles. It is also found in the adrenals, pituitary, thyroid and hair. Food sources of this amino acid are alfalfa sprouts, almonds, apricots, apples, beets, carrots, cucumbers, cherries, figs, lettuces, sweet peppers, strawberries and watermelons.

VALINE — Involved in the functioning of the mammary glands and ovaries. It is found in apples, almonds, beets, carrots, celery, okra. pomegranates, squashes and tomatoes.

5.3.2 Functions of Amino Acids

We can say that, generally, the amino acids serve five functions in the body:

1. They furnish the material from which proteins are synthesized by various cells.
2. They are used by the cells in manufacturing enzymes, hormones and other nitrogenous products.
3. They are used in constructing blood protein.

4. They may furnish a source of energy, with some of the amino acids being transformed into glucose and glycogen.
5. They aid the body in performing many functions as described in their individual descriptions.

5.4 Amino Acids—Essential and Non-Essential

5.4.1 Essential Amino Acids

Of the 23 amino acids, eight are termed essential. These are isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophane and valine. It is also said that a ninth amino acid, histidine, is essential for infants.

An "essential amino acid" is an amino acid that the body cannot produce by reduction (oxidation) from another amino acid. In other words, an essential amino acid must be found in a food source and cannot be produced within the body.

5.4.2 Non-Essential Amino Acids

The remaining 15 amino acids are termed "non-essential." but this term is somewhat misleading. They are essential to our health and well-being, but it is not essential that they be present in the foods we eat (provided that there is an adequate supply of the essential amino acids in our diet).

6. "Complete Proteins"

Now that we have an understanding of the amino acids, we can intelligently discuss one of the biggest myths in nutrition—the necessity of eating complete proteins.

6.1 Definition

A complete protein is usually defined as* a single or combined protein source which has all eight of the essential amino acids. Meat, for example, is said to be a complete protein, and so are eggs, dairy products, soybeans and many nuts. It has been suggested by some individuals and groups that a complete protein (or a combination of proteins that will provide certain proportionate amounts of the eight essential amino acids) be eaten at every meal to make sure that we obtain all eight of the essential amino acids, preferably in certain proportions.

6.2 Are Not Essential In the Diet

This idea of a "complete protein" has been so heavily advertised by special interest groups, such as the meat and dairy industries, that the average person believes he must eat meat (or at least milk and eggs if a "vegetarian") or at the very least prepare protein combinations such as grains and beans or take protein supplements in order to get enough high-quality protein. All of these beliefs are false and. in fact, may lead to practices which increase the toxicity in the body.

This is an important concept in understanding protein needs: *It is not necessary for all eight of the essential amino acids to be present in one food or even within one meal in order to obtain our full protein needs*. As we have discussed, the body has its own amino acid pool to draw from to supply

amino acids which may be missing from dietary sources. Needed amino acids may be withdrawn from those already in circulation, or the necessary amino acids may be released by the liver or other cells into the circulatory system. The amino acid pool thus acts as the supplier of the essential amino acids missing from incomplete proteins. This fact is proven by observing patients after lengthy fasts who exhibited not a protein deficiency, but a restored protein balance.

Only the carnivorous animals in nature eat "complete proteins." Most of the vegetarian animals eat grass, tubers, fruits, grains, etc. and often of a limited variety. Yet they never exhibit signs of protein deficiency. In fact, protein poisoning from eating high-protein foods is far more common among Western man than is protein deficiency.

The "complete protein" idea also falls apart if we realise that the amino acids in many of the so-called complete protein foods cannot even be fully used by the body. Meat as eaten, for example, is usually only the muscle meat of the animal, which is particularly low in some of the essential amino acids. The soybean has an anti-enzyme factor which blocks or inhibits the assimilation of some of its essential amino acids. Proteins which have been cooked or heated (such as meat. fish, eggs and most dairy products) may lose-up to 50% or more of their essential amino acids due to the creation of enzyme resistant linkages caused by the cooking. So we can see that many of the so-called "complete proteins" are not even completely used by the body.

6.3 Are Present In Wholesome foods

If you are truly concerned about eating a food that has all eight essential amino acids which are in a form easily used by the body, we would suggest some of these wholesome foods.

All contain the eight essential amino acids:

Fruits	**Nuts**	**Vegetables**
Bananas	Almonds	Alfalfa Sprouts
Tomatoes	Coconuts	Bean Sprouts
Dates	Filberts	Carrots
	Sunflower Seeds	Eggplants
	Walnuts	Sweet Potatoes
	Brazil Nuts	Broccoli
	Pecans	Cabbages
		Corn
		Okra
		Squashes

There are many other foods suitable for the human dietary which also contain all eight essential amino acids.

It should be emphasized, however, that it is *not* necessary for one food or one meal or one day's intake of food to contain all eight essential amino acids. We do not need to eat meat, cheese or soybeans to obtain complete protein, nor do we need to mix grains and beans or milk and cereals to get a complete protein in one meal.

A varied diet of fruits, vegetables, nuts, seeds and sprouts can furnish us with all the essential and non-essential amino acids, along with all the other nutrients we need. And, it can do so in the most wholesome foods suitable for the human diet and in a form most readily and efficiently used.

7. Protein And The Optimum (Life Science) Diet

So far we have discussed what protein is, why we need it and how much we require. Now it is time to examine the optimum diet for obtaining all our protein needs. A diet consisting of fresh fruits, vegetables, nuts, seeds and sprouts can furnish us with the highest quality protein in a form that is readily digested and assimilated.

The protein in this diet is best for the human body for the, following reasons:

1. It is consumed in its raw state;
2. It is free from toxins and poisons that accompany many other protein sources;
3. It is present in wholesome foods along with other needed nutrients;
4. It is easily digested and assimilated by the body; and
5. It is of sufficiently high quality and quantity to meet all the body's requirements.

7.1 Raw Protein Is The Best

The Hygienic or Life Science diet includes proteins only in their raw form. Fruits, vegetables, nuts, seeds and sprouts do not require cooking to increase their palatability or digestibility.

When proteins are subjected to high heat during cooking, enzyme-resistant linkages are formed between the amino acid chains. Consequently, the body cannot break these amino acids down for its use. What the body cannot use, it must eliminate. The cooked proteins then actually become a source of toxic matter within the body.

When wholesome protein foods are eaten raw, the body can make maximum use of all the amino acids without the accompanying toxins of cooked foods. It should be noted that some high-protein foods, such as soybeans and lima beans, have naturally occurring toxins which are said to be neutralized by heat. It is best not to eat these types of proteins since the cooking process does not totally remove the toxic effect these foods create.

7.2 Wholesome Proteins Are Non-Toxic

Proteins consumed in the Hygienic diet are also free from the poisons and toxins that often accompany other protein sources. We have already mentioned the toxins present in many legumes (which, incidentally, are best neutralized by sprouting the legume instead of cooking it). Similarly, most grains (with the exception of young fresh corn) cannot be digested when eaten raw. The cooked grains, however, still contain the toxic by-products from inhibitory enzymes present in the grains. Although

legumes and grains are not a proper part of the Life Science diet, they are not nearly as toxic or poisonous as the other traditional protein sources:. meat, milk, dairy products, fish and eggs.

Not only do meat, milk, dairy products, fish and eggs contain naturally-occurring toxins injurious to the body, but they are also often poisoned during the producing and selling of them. Since the unsuitability of these foods is discussed elsewhere in this course, only a few facts about their drawbacks as protein sources need be mentioned:

1. Meat and fish contain naturally-occurring toxins due to decaying cell nuclei in the flesh as well as toxins the animal itself releases when it is killed.
2. Meat has many pesticides and additives, including but not limited to the following: methoxychlor, chlordane, heptachlor, toxaphene, lindane, benzene, hexachloride, aldrin, dieldrin, DDT, sex hormones, stilbestrol, nitrates, nitrites, etc.
3. Meat, eggs and dairy products contain over ten times as much pesticide as commercially-sprayed fruits and vegetables.
4. Eggs are usually produced on a high chemical-hormone diet and are totally nonconsonant with the human digestive physiology.
5. Milk is poorly tolerated by the majority of the world's population and contains the hormones that are produced in the cow as a result of the artificially induced and prolonged lactation. This writer personally knows a young girl who began lactating due solely to a diet that was heavy in hormone-laden dairy products.
6. Meat, fish, eggs and dairy products are the major contributors to cholesterol problems.

7.3 Wholesome Protein Foods Contain A Wide Variety of Nutrients

Proteins consumed in the Hygienic diet occur in wholesome foods which contain a wide variety of needed nutrients. Many of the traditional high-protein foods such as meat, fish, eggs, dairy products, grains, etc. are usually poor in many vital nutrients.

For example, meat is an exceedingly poor mineral source; cow's milk is so iron-poor that a growing baby must use its own stored iron supplies in the spleen for normal growth; grains are so low in sodium that people add salt to them for palatability.

On the other hand, fruits, vegetables, nuts, seeds and sprouts are rich sources of all the minerals, vitamins and enzymes we need, besides being a source of high-quality protein. The Hygienic diet provides us with a totally balanced supply of all vital nutrients as they naturally occur within whole foods. For instance, for efficient protein use, an adequate amount of carbohydrates must be present. Otherwise, the proteins are converted to carbohydrate fuel for the body and the protein is not used for its original purpose. Meat is so poor in carbohydrates that much of its protein must be used as a secondary and inefficient fuel source for the body. Fruits, vegetables and nuts, however, have a large supply of natural carbohydrates so the body can use all the protein contained within these foods for its original purpose and not create toxic byproducts through unnecessary protein conversion.

7.4 Wholesome Protein Is Easily Digested and Assimilated

Protein in the Hygienic diet is easily digested and assimilated, The Life Science diet stresses the importance of eating compatible foods for ease of digestion. Since protein digestion is the most complex gastric process, it is important that protein foods be eaten in proper combinations with other foods.

For instance, naturally occurring high-protein foods such as nuts, seeds and avocadoes should be eaten with non-starchy and leafy green vegetables for the best results. Salad vegetables aid in the digestion of concentrated proteins and "also supply high-quality amino acids of their own.

In a typical diet, proteins are often combined with starches: meat and potatoes, grains and beans, milk and cereal, and so on. Starches and proteins require completely different digestive environments and

enzymes, and when eaten together, neither is fully digested or used by the body. As a result, most protein eaten in a conventional diet which ignores proper food combining is not fully digested by the body.

7.5 Protein in a Hygienic Diet Meets All Our Needs

The protein in a Hygienic diet is of sufficiently high quality to meet all the body's requirements. All essential and non-essential amino acids may be obtained from a diet of fruits, vegetables, nuts, seeds and sprouts.

A varied diet of these wholesome foods eaten in their natural state can provide all our protein requirements without concern for the exact number of grams of protein consumed. It is not necessary when eating a natural diet to be preoccupied with obtaining any specific nutrient. They are all supplied in abundance, including protein. Simply for the sake of scientific validity, and not as a regular practice, we have chosen some examples of Hygienic menus in order to analyze their protein contents.

All of these menus and suggestions have been devised to furnish 30 grams of protein to an adult weighing 150 pounds. This is equivalent to one gram per five pounds of body weight. More or less protein may be required, depending upon body weight, metabolism, body toxicity, etc.

7.6 Daily Menu Suggestions To Supply 30 Grams of Protein

Food	**Ounces**	**Grams of Protein**
Breakfast		
Grapefruit	14.0	2.0
Lunch		
Persimmons	7.0	1.6
Pear	3.5	0.7
Dates	7.0	4.4
Dinner		
Vegetable Salad	11.0	7.4
Kale	4.0	6.0
Squash	3.5	1.1
Avocado	9.0	6.8

Total prams of Protein		30.0
Breakfast		
Oranges	16.0	3.8
Lunch		
Almonds	3.0	14.0
Celery	8.0	2.0
Dinner		
Bananas	18.0	6.5
Dates	6.0	3.7
Total Grams of Protein		30.0
Breakfast		
Figs (fresh)	16.0	5.4
Lunch		
Avocado	9.0	6.8
Tomato	8.0	2.5
Broccoli	6.0	7.1
Lettuce	4.0	1.7
Dinner		

Apricots	12.0	3.0
Cherries	12.0	3.5
Total Grams of Protein		30.0

Of course, we do not suggest that food be weighed or eaten in ounces; nor should we eat according to predetermined menus. These are only suggestions as to what one person might desire to eat in a day. If he did so, he would obtain 30 grams of protein with all the essential amino acids.

It is better to eat according to hunger and body need and not according to grams, ounces or nutrient charts. When presented with a variety of wholesome foods, the body naturally selects the foods it needs to satisfy its particular requirements at that time.

8. Questions & Answers

When I stop eating high-protein foods I feel weak. Doesn't this prove we need these foods?

> Actually, just the opposite. High-protein foods create an enormous amount of toxins in the body. When we stop eating those foods for a period of time, the body has an opportunity to eliminate those toxins. It is the elimination of the poisons from the body caused by a previous high-protein diet that causes this weakness—not a lack of protein. It is best to fast (for short periods of time or one longer fast) and allow the body to rid itself of these toxins. Then, you will feel quite strong eating those foods normally thought to be low in protein.

Is protein combining harmful. I read a good book about it.

> Unfortunately, most books on protein combining suggest eating two or more concentrated protein foods together at the same time. Different proteins require different digestive processes, and combining two heavy foods, like grains and beans for example, makes the body work too hard. Some protein combinations, like milk and cereals, for example, are so indigestible that little if any good can come from eating them. Quite simply, the ideal protein combinations are those that require the same digestive processes. Nuts and leafy greens, for example, complement each other's ammo acids and at the same time are agreeable food combinations.

I can't digest nuts and seeds. Can I still get my protein from this diet?

> Most definitely. Nuts and seeds are concentrated proteins—all the foods in the Hygienic diet contain protein. If you eat a calorie-sufficient diet of fruits, vegetables and sprouts, you can obtain all the amino acids that you require. Avocadoes are sometimes better tolerated than nuts and seeds, and they too have a high concentration of protein. In time, as your health improves, you will probably gain greater digestive abilities and you will be able to eat moderate amounts of nuts and seeds.

Shouldn't we eat a high-protein breakfast?

I can't imagine why. The idea behind a high-protein breakfast is that it will give us "energy" throughout the day. Actually, it has the opposite effect because protein digestion is the most complex digestive process of all. If you want energy in the morning, eat a high-carbohydrate breakfast of fruits. Better yet give your body a rest from food in the morning. Soon you will be able to function at a higher level of energy than when you ate a heavy breakfast.

I'm a weight lifter, and I feel that I need protein supplements. Aren't I an exception?

Weight lilting and other strenuous physical activities primarily call for an increase in the consumption of natural carbohydrates for muscle fuel. While it is true that protein is used in building muscle tissue. I must refer you to the gorilla or the elephant. These are well-muscled animals. They eat no high-protein foods, take no protein supplements and drink no special protein drinks. In fact, they build their musculature from greens and fruits. If you feel that you need concentrated protein. I suggest seeds or nuts in moderation. Athletes who eat a very high-protein diet (as is the ease with weight lifters) often develop gout later in life and experience severe kidney problems.

Article #1: The Question Of Proteins By Arnold DeVries

The following is an excerpt from a book by Arnold DeVries called *Fountain of Youth*.

The building blocks of protein consist of 23 amino acids. Eight of these have been proven to be essential for the support of life and growth. A few others are "convenient" in the sense that animals thrive better if they get them. Proteins which contain all of the essential amino acids as well as the convenient ones, are called complete or first class. A food which contains complete protein will support life and growth if used as the sole source of protein in the diet. The foods which contain incomplete protein will not in themselves support life and growth.

It is often claimed that the difficulty of obtaining complete proteins on a fruitarian diet makes such a diet dangerous except when in the hands of an expert. But this is really not so. A child living upon the fruitarian diet could hardly keep from getting sufficient complete protein if he simply used the plant foods according to his own instinctive desires. After all, there is an abundance of plant foods which supply us with complete proteins of the highest biological value. The researches of Cajori, Van Slyke and Osborn have known conclusively that the protein of most nuts is of the very finest type and contains all of the essential and convenient amino acids. Among the nuts possessing complete proteins are butternuts, pecans, filberts, Brazil nuts, English walnuts, black walnuts, almonds, pine nuts, chestnuts and coconuts.

In addition to being complete, the protein of most nuts is of high biological quality. Investigations at Yale University and the research work of Dr. Hoobler of the Detroit Women's Hospital and Infant's Home both demonstrate the superiority of nut protein. The methods of research used by Dr. Hoobler provided a most delicate biological test of the protein of food, and it showed that the protein of nuts not only provides greater nutritive efficiency than that of meat, milk and eggs but that it is also more effective than a combination of the animal proteins.

Coconut globulin is perhaps the best of the nut proteins. Johns, Finks and Pacel of the Protein Investigation Laboratory of the U.S. Department of Agriculture found that this protein produced supernormal growth in young rats when used as the sole protein in the diet. In other words the rats grew more rapidly than when given cheese, meat, eggs, milk or any other high-protein food. McCandish and Weaver have also found that the protein of coconuts is superior to that of other foods and claim that

coconut meal is of greater value than soybean meal. As the soybean is equal in biological value to any of the animal proteins, this would mean that the coconut protein is in a class by itself and is perhaps the finest protein known.

No fruitarian need have any worries over his protein supplies. Any well-balanced selection of plant foods should meet the body's protein needs very well; in fact, it will meet them far better than the omnivorous diet, for it supplies the protein in just the right amounts.

All available evidence indicates that a low-protein diet composed of plant foods is most conducive to the best health. In the 19th century two great German scientists, Justus Freiherr von Liebig and Karl von Voit, carried out experiments to determine how much protein the body requires each day. Liebig assumed that, because muscle is composed largely of protein, we should use a diet which is very rich in this dietary factor. Later Voit carried out experiments with dogs, the result of which led him to believe that the daily human requirement is 118 grams.

It is now known that the conclusions of Liebig and Voit are not accurate. Muscles can be built from plant foods, which are relatively low in protein content better than from animal flesh. And the experiments with dogs carried out by Voit can hardly be applied to human beings, for the protein requirements of dogs and other carnivorous animals differ from those of the frugivorous animals.

The most accurate present day estimates of the body's daily protein requirement vary from about 22 to 30 grams. These estimates are based upon experiments with humans. Prof. Henry Sherman of Columbia University places the daily requirement at 30 to 50 grams, but it is probable that the other estimates, which include those of the Swedish scientist Ragner Berg, are more nearly correct. However, even 30 to 50 grams of protein is not much. It could easily be supplied by a diet of plant foods.

Dr. Mikkel Hindhede, of Denmark, made the first mass application of a diet very low in its protein content to an entire nation. During World War I this doctor was made Food Administrator of Denmark. In an effort to prevent food shortages, he greatly lowered the production of livestock and fed the plant foods to the human population rather than to the animals. As an average of only 10 percent of the value of plant foods is recovered in the milk, eggs and meat of the animals, it is obvious that this involved a great saving from the standpoint of nutrition. But Hindhede eventually discovered that the diminished use of animal foods meant far more than that. Within one year's time the death rate had decreased 40 percent. In addition, the Danish people experienced less disease. When thousands of people throughout Europe suffered influenza, Denmark was not affected. The other nations, using their high-protein diets consisting largely of animal foods, suffered greatly and their people died by the thousands.

Nuts are rich in protein, but they are not used to such an extent in the fruitarian diet that the body receives an excess of this material. The normal desires of the fruitarian call for a wide variety of plant foods with no particular dependence upon nuts. Fruits are the chief foods used and the desire for nuts is in accordance with the body's need for protein. Meat, eggs, milk and cheese are all unneeded high-protein foods. Their excessive protein acts as a burden to the body and favors the development of disease.

Article #2: Protein by Ralph Cinque, D.C.

The following article is from *The Health Crusader.*

> *"Pro-tein: any of numerous naturally-occurring extremely complex combinations of amino acids that contain the elements carbon, hydrogen, nitrogen, oxygen, usually sulfur and*

occasionally other elements (such as phosphorus or iron); an essential constituent of all living cells; is synthesized from raw materials by plants but assimilated as separate amino acids by animals."

Most of what was in the past believed to be true about the body's need for protein has, in recent years, been shown to be false. This is true particularly in regard to the amount of protein the body requires.

The first well-publicized study of protein needs was done by the German physiologist Voit at around 1890. Voit studied healthy, young, physically active German men who were eating their conventional diet. He found that they maintained "nitrogen balance" on a diet containing 120 grams of protein daily. For years this was accepted as the standard.

Urinary nitrogen (in the form of urea, uric acid, creatinine and other substances) is derived almost wholly from protein metabolism. Voit assumed that the amount of urinary nitrogen excreted reflected the body's needs. He observed that when the German males reduced their protein intake significantly, they initially excreted more nitrogen than they consumed, a state he referred to as "negative nitrogen balance." Had he continued his experiments longer, he would have discovered that these same subjects would have re-established a nitrogen balance at the lowered intake level.

Today we know that it is not valid to determine needs on the basis of excretory levels. The body excretes the residues from materials it has merely disposed of. Whatever amount of nitrogen we consume in the form of protein must ultimately be eliminated. When an enormous excess of nitrogen enters the system, the body merely deaminizes the amino acids, converting the amino radicals into ammonia, urea and other by-products of protein breakdown. The remaining *ketogenic* or *glucogenic* acids then undergo combustion in the same manner as the fats and carbohydrates, rendering calories.

High-protein diets actually accelerate the turnover of proteins in the body, causing a metabolic bonfire that may mistakenly be regarded as a state of well-being. When one reduces the amount of protein consumed, it takes time for the body to re-adjust its metabolism, to reset its thermostat, so to speak. This is why a state of negative nitrogen balance may temporarily ensue.

During World War I the Danish government hired a physiologist by the name of M. Hindhede to study protein needs. The hardships of the war had made animal foods scarce and prohibitively expensive. A people who had been accustomed to eating lots of meats, eggs and milk were forced to rely upon grains and vegetables, especially potatoes, to sustain themselves.

Hindhede's task was to determine how little protein people could consume and still maintain health. He did extensive studies on young and old alike over a period of several years and concluded that 60 grams of protein a day was more than adequate to meet the body's needs. Even the lowly potato, Hindhede said, contained enough high-grade protein to supply body needs (assuming that total caloric intake was adequate).

The orthodox scientific community vilified Hindhede. (He is even left out of the 1963 *Encyclopaedia Britannica*, while Voit is in it and his discoveries praised.) Imagine, cutting the Voit standard for protein need in half! More recent studies, however, based upon verified patterns of enzyme synthesis, collagen turnover and muscle metabolism have drastically reduced the Hindhede figure. *Guyton's Physiology* (considered the standard in the field) maintains today that 30 grams of protein a day is fully adequate. Other respectable sources cite figures in the 20s, but even Guyton figure of 30 grams is significantly lower than the daily allowance of 70 grams recommended for active adult males by the Food and Nutrition Board of the National Research Council. This 70 grams includes a considerable "safety factor" (to allow for some degree of malabsorption).

Many if not most Americans are consuming in excess of 100 grams of protein a day despite the much lower recommendation. Eliminating the by-products of this protein overload places great stress upon the body. The liver and kidneys bear the brunt of the punishment. Fats and carbohydrates burn clean, leaving a residue of only carbon dioxide (which is relatively innocuous and is readily excreted by the lungs) and

water (which is hardly a waste product). Protein metabolism, on the other hand, leaves non-oxidizable waste products such as urea, uric acids, etc. It is a much greater burden for the body to process great surpluses of protein than to process excesses of fat or carbohydrate. It behooves all of us to consume no more protein than we need so as to prevent premature aging and the deterioration that comes from organ abuse.

Another mistaken concept regarding protein needs has to do with protein quality. For decades it was held that only animal proteins contained a full complement of all eight essential amino acids (those we cannot synthesize from other amino acids) to meet the body's needs. Although most natural foods do contain all eight essential amino acids, the claim was that the proportion of one amino acid to the others was not right. It was observed that animals grew and matured more rapidly on animal proteins than on vegetable proteins, so vegetable proteins were declared to be inadequate. Speed of development and size were considered to be a direct reflection of nutritional thoroughness.

Today we know that weight and size are not necessarily the best indicators of health and well-being, that gigantism is just as pathological when spread throughout a population as it is when it occurs in an isolated individual. We know that an individual's body is not immediately dependent upon the content of his meals in order to maintain nutrition. Referring again to *Guyton's Physiology*, radioisotopic studies have shown that at any given time protein synthesis utilizes two-thirds endogenous amino acids (from the blood circulatory pool) and one-third exogenous amino acids (as derived from meals). In other words, in regard to protein, the body is always living upon its reserves and the purpose of eating is to replenish those reserves. It matters not whether a given meal provides the exact proportion of amino acids because the body is fully capable of withdrawing from reserve sources whatever amino acids are needed to balance out the dietary supply.

Frances Moore Lappe stated in *Diet For a Small Planet* that one must combine different proteins at the same meal or otherwise preclude the possibility of utilization. Ms. Lappe said that consuming single vegetable proteins would not provide adequate nutrition. This idea, however, has been shown to be false, not only by physiological calculations, but also by the empirical evidence gained from observations of countless numbers of people around the world who live and thrive on simple vegetable diets. The experience of Hygienists in this country also provides proof of the sufficiency of simple combinations of non-animal foods.

Many common foods that we don't generally regard as sources of protein actually supply substantial amounts. The case of the potato has already been cited. Even more impressive are green leafy vegetables, which supply 3-6% protein of high-biological value, on the average slightly more than cow's milk and several times more than mother's milk. Eating a large raw vegetable salad every day can alone supply most of the protein the body needs. Eating a variety of whole natural foods that supply an adequate number of calories would, by necessity, supply an adequate amount of protein. The problem isn't how to get enough protein, but how to avoid getting too much.

Another widely-accepted but incorrect idea is that athletes and hard physical workers require more protein than less active people. Actually muscular activity entails no increase in the rate of protein catabolism (breakdown). Urinary creatinine is considered a reliable indicator of muscle breakdown, and it has been found that physical activity does not significantly increase creatinine excretion. Nor does it significantly increase the excretion of urea. What physical activity does entail, however, is a rapid utilization of muscular glycogen. It is carbohydrate replenishment that vigorous activity calls for, not protein.

The average American consumes two to four times as much protein as he needs, and cancer (which is characterized by runaway protein synthesis) is killing one person in four. Cutting down total protein in general and animal protein in particular is a desperate need. It is important to realize that all of the marvelous amino acids contained within flesh foods were derived from the animals diet. Other animals are just as powerless to synthesize the essential amino acids as we are; and we are just as capable as they of deriving our amino acids directly from the only producing source: plants.

Article #3: The Superiority Of Plant Foods by Ralph Cinque, D.C.

This category could also be designated the *detrimental effects of animal foods*. All animal products (with the exception of mother's milk) have certain negative features which make their dietary use questionable. Consider, first of all, the effect that animal foods have upon protein consumption. Even modest use of meat, fish, eggs and dairy foods tends to create a protein overload, and this is one of the most dangerous dietary excesses.

Research has shown that high-protein diets actually promote aging and early degeneration. Too much protein exerts a tremendous burden upon the liver and kidneys. It also leaves acid residues in the blood and tissues which must be neutralized by sacrificing indispensable alkaline mineral reserves.

The process of aging is characterized by the transfer of calcium from the bones to the soft, tissues, that is, to the arteries (arteriosclerosis), to the optic lens (cataracts), to the ureters (kidney stones), to the skin (wrinkles), to the joints (osteoarthritis), to the valves of the heart (producing valvular stenosis and insufficiency), to the tendons and ligaments (producing frozen shoulder) and to other sites. This, of course, leaves the skeleton osteoporotic, leading to the development of stooped posture, a kyphotic spine, spontaneous fractures and other maladies that are so common to the elderly. High-protein diets (due to the accumulation of phosphoric, sulphuric, uric and other acids) accelerate this demineralization of bone and bring about calcific deposits in the soft tissues.

One could argue that nuts and seeds contain as much protein as meats, eggs, etc., and therefore they are as likely to create an excess. However, most people are easily satisfied eating a few ounces of nuts or seeds every day, whereas few people will eat just a few ounces of yogurt. Restaurants serve up to a pound of meat at a sitting, along with other foods. Cottage or ricotta cheese is eaten in huge quantities, even by many so-called vegetarians. The simple truth is that animal proteins tend to promote overeating more so than do plant proteins.

The relationship between high-protein diets and cancer has been clearly established by studying both animal and human populations. Remember that cancerous cells are characterized by runaway protein synthesis and rapid cellular division. Protein synthesis is accelerated by increased protein intake, so it is not surprising to discover that cancer bears a close tie to excess protein. There is a direct correlation between the amount of protein in the diet and the incidence of cancer on a worldwide basis. Americans, Australians and West Europeans, who ingest the largest amounts of protein, also have the greatest incidence of cancer, whereas the rural Chinese, the East Indians and native peoples of Latin America have the lowest cancer incidence. This is no casual relationship and it cannot be written off by blaming it on the "stress of modern life."

Animal products are loaded with the worst kind of fat—saturated, cholesterol-laden animal fat. A mountain of evidence has been accumulated relating high animal fat intakes with the development of cardiovascular disease (which is characterized by the deposition of saturated fat and cholesterol in the intimal layer of arteries), and many different malignancies including breast cancer, colon and rectal cancers, and cancer of the liver. Even such diverse conditions as multiple sclerosis and diabetes have been related to the consumption of animal fats. As we have already stated, heated animal fats have been shown to be even more carcinogenic, and considering that Americans take all of their flesh, milk and eggs well cooked, it's no wonder that one in four eventually succumbs to cancer. Paradoxically, those people who subsist on low-fat, low-protein, largely vegetarian, unrefined diets experience very little cancer. The incidence of cancer, cysts, tumors and heart disease among American Seventh Day Adventists is approximately half the national average. This is quite remarkable considering that only about half of this group are thought to be vegetarian.

Flesh, fish, yogurt and cheese contain various putrefactive products resulting from their bacterial

decomposition. Putting partially-spoiled food in the body can hardly be considered a Hygienic practice, despite the arguments of the fermented food enthusiasts. Flesh also contains considerable quantities of the end products of metabolism (like uric acid) which are held up in the tissues at the time of death. These wastes are poisonous, irritating and burdensome to the body. Considering also that animal products tend to be reservoirs for pesticides, herbicides and various other drugs and inorganic contaminants, there are many good reasons to avoid using them.

Excerpt from an article by Ralph C. Cinque, D.C., entitled "Hygienic Considerations in the Selection of Foods," which was published in Dr. Shelton's Hygienic Review.

Article #4: The Question Of Protein by Dr. Ralph Bircher Benner

> *"Believe those who seek the truth; suspect those who have found it."*
> *—Andre Gide*

Gide's admonition seems to me nowhere more applicable than in the controversy over protein. In pertinent research literature, which it has been my duty to examine critically and without bias for the last 40 years. I have seen the most respectable kind of work and such a shameful pile of ignorance, much of it written by the most respected authors, as I have never seen in any other scientific field. The conclusions contradict so fantastically that the reader finds himself holding his head in despair. The textbooks, though, naturally don't reflect these contradictions. They merely repeat the results of agreements, and a lot doesn't appear in them for the simple reason that "what may not be must not be!"

First the basic question: "How much protein does a human being need to stay healthy and perform well? What is the daily requirement, the minimum, the optimum, for a standard body weight of 70 kg?"

At the turn of the century, the respected opinions were those of Rubner and Voit: we need 120-160 grams per day. But Chittenden showed in human experiments that best performance and health were possible on 50 grams, and Hindhede set the figure at 30. Forty years later. A. Fleisch, president of the Swiss Wartime Nutrition Commission, wrote in his book *Nutritional Problems in Times of Shortage* (Basel, 1947) "No quantity in the physiology of nutrition is so uncertain and finds such extreme advocates as the need of the human organism for protein." Today, after a quarter century during which mountains of pertinent research have been published every year, the situation is exactly the same. Or worse.

In Russia, Jakolev set up a minimum requirement of 141-163 grams. Kuhnau saw an optimum of 200. Kofranyi of the Max Planck Institute proved that complete nitrogen balance and performance ability could be maintained on 25 grams, and Oomen and Hipsley found a population that develops not just full health, but magnificent muscular structure and corresponding physical performance, on a mere 15-20 grams. Elvehjem insists that the optimum is near the minimum.

In the meantime, the American Research Council's Food and Nutrition Board agreed on a daily requirement for adults of 70 grams. This number is. in fact, found in their tables. Sherman, a member of the Board, described the way this figure was arrived at. The evidence pointed toward a much lower amount, somewhere a round 35 grams. But if the protein requirement had been set so low, there would have been a public outcry. And so a corresponding "margin of safety" was adopted, and "70 grams" was published. Because the scientific basis for this was non-existent, the word "recommendation" was used instead of "requirement." But who knows how this recommendation came into being? And it was

publicly interpreted as the requirement, in fact as the minimum. Thus, not long ago Stranskky and Krucker in the *Therapeutische Umschau (Therapeutic Review)* expressly listed 70 grams of protein per 70 kg of body weight as the "minimum dosage ... which is indispensable for the maintenance of vital biochemical processes." Sherman had good reason for writing about the "high-protein mentality" of nutritional specialists. It's not unusual for a doctor to prescribe three eggs and yogurt for breakfast, plus meat at each meal, and patients often fear a protein deficiency if they're asked to stay away from meat for a few days.

No less confusing is the matter of evaluating protein quality and whether animal or plant protein is preferable. According to the textbooks, vegetable protein is inferior. At least a third, preferably half, of the protein intake supposedly should be from animal sources, and the public unconsciously thinks "meat" when it hears "animal," though, of course, milk and eggs are also "animal sources." The presumed inferiority of vegetable protein lacks binding scientific proof. If scientists had studied the geography and history of nutrition as well as they conducted their chemistry and animal experiments, they would never have fallen into this dogma. There have been and there are now populations numbering in the millions in various parts of the world, it is known from penetrating research, that have lived and developed enviable health and strength for centuries and even thousands of years on a purely vegan diet.

The quality and requirement of protein depend on several factors, for instance on healing, which can considerably lower the quality of the protein. The usual heating of meats results in a significant decrease in essential amino acids. The same is true of drying and preserving. It probably isn't acceptable to eat raw meat to avoid these degenerations; but eating other raw foods contributes no small amount to reducing the total need for protein.

Raw food decreases the need for protein in yet another way: the usual, everyday diet requires 6-8 grams of protein per day for the synthesis of digestive juices. But raw foods are easily digested, thanks to the enzymic content, thus economizing on digestive enzymes. Vitamin A has a "decisive relationship to protein metabolism." Protein deficiency damage is extensively conditioned by vitamin A deficiency. An everyday diet using margarine is as a rule deficient in vitamin A. It is similar to vitamin K, which like provitamin A is most richly present in fruit and is best assimilated in a raw diet with full-value oil.

We could go on, and repeatedly come back to the central question of protein economy.

Protein economy begins with the feeding of babies. In the early 50s nature failed the test of American medicine. It was found that breast milk contains 60% less protein than the infant needs. A "formula" was created with 2 1/2 to 3 times the protein plus added salt. Today we know that it wasn't nature but science that flunked: The devastating consequences soon appeared: kidney damage, hyperacidity with osteoporosis, dangerously high phenylalanine and tyrosine content in the blood, poor protein metabolism and increased acceleration with consequent stressful disparity of physical and mental growth. An attempt has been made to transfer advertising concepts of growth and weight gain rates to actual human beings —and it fell through. There was a harmful habituation to the wear and tear of a high-protein diet. The frugal use of protein was not learned. From birth on, the child was being burdened with both "stress conditioning factors" (Selye), high protein and salt. Important developmental phases were shortened by accelerated growth and this, according to Portmann, works against the development of the "super-type" (Wellek), that human type which is most needed in our timer who is not just able to analyze but also grasp the whole of a phenomenon in its form and essence.

To return to stress theory: "It is a matter of experience," wrote A. Fleisch, president of the Swiss Wartime Nutritional Commission, in his book *Nutritional Problems in Times of Shortage* (Basel, 1947) "that increased protein consumption also lowers the number of calories taken in." The stimulating qualities of protein—especially meat protein—lead to over-estimation and over-consumption, which are not justified by nutritional physiology because they lead to "luxuriant combustion"—an inefficient "burning off" of excess. There must be another, especially stimulating, irritative effect of eating meat above and beyond the irritative effects of excess protein (specific-dynamic effect) and the extractive and

general products of roasting. This irritative effect, which has since been isolated, is caused by uric acid, a very strong irritant on the sympathetic nerves. And so in meat we have a strongly hypermetabolizing three- to four-fold irritative effect.

This has contributed to its reputation as "strength food," far above its actual nutritive value. ("Meat broth" means the same as "strength broth" in German.)

Our contemporary situation demands the mobilization of our best powers to overcome the crisis of existence in our culture. I believe we have reasons for reconsidering our use of stimulants, which has become continuous and excessive. Continuous prickling of the ergotropic nervous system, which seems to be a vital necessity in these times, is no sign of strength. It stands in the way of the regenerative work of the trophotropic nervous system. This is the main reason why we renounce all stimulants including meat. Regeneration demands detoxification and metabolic economy. This is also true in athletics, where the last degree of performance must be extracted. This refers not only to alcohol, about which the French learned bitter lessons at two Olympiads, and nicotine and other stimulants—it is just as true of meat, and this is proved by the proportionally unheard-of string of international athletic records set by vegetarians. The advantages show up with special clarity in high mountain exercise. Some typical consequences of conversion to a protein-economical, full-value diet are a 10-20% reduction in oxygen requirement and a 30% lower calorie requirement with correspondingly improved performance, recovery and adaptation ability. I personally was surprised to find this out while climbing 17,343 foot high Ixtacihuatl. Indian populations living at 13,000 feet in the Andes highlands hold stubbornly to their ancient carbohydrate diet "in spite of the well-meaning advice from the!" World Health Organization Council. They race bicycles at that altitude for distances of 150 miles at an average speed of 25 mph. Similarly the Tarahumara Indians of Mexico run 90 miles at seven mph, with no heart expansion or shortness of breath. Experience has taught this highland people to stick to carbohydrates. Even rats that were taken to high altitude's suffered deficiencies in nutritional utilization on a high-protein diet, but not on lower-protein fare. The luxuriant combustion and hypermetabolizing effect of an excess-protein diet occur at sea level too, but they have immediate practical significance in the high mountains.

A further turn was taken in the protein question with the recent rise of amyloidose research. Schwarz, a professor of physiological pathology in Frankfurt, described the storing and slowly destructive effect of the penetration of tissues and organs by amyloid. This is a waxy, fatty protein mixture considered "the most important and perhaps decisive cause of decline with age," in so-called diseases of old age and specifically, atheromatosis. Katenkamp and Stiller called this amyloidosis "extraordinarily pervasive in every kind of deposited tissue."

In amyloidosis must lie the key to healing of those diseases of old age which have previously been casually unclarified. It is clear that amyloid consists exclusively of degenerate protein reduction by productions which could be the result of excess protein. Excess protein must be quickly burned, but cannot be sufficiently eliminated. Amyloid contains rich amounts of the amino acids tryptophane and tyrosine. Five to ten times as much tryptophane and five to seven times as much tyrosine are found in the dry substances of meat as that of vegetable protein sources. It remains to be investigated whether other sulphurous amino acids play a similar role, and what the amyloid situation is among populations living on protein-frugal diets. All the essential amino acids, especially the sulphurous, can cause damage in overdoses, through creation of poisonous substances or other disturbances. On 70 grams of protein a day containing all the essential amino acids, there can be excessive intake of some amino acids. The connection between amyloidosis and excess protein is easily proved by animal experiments. It is produced with special ease in case of high cholesterol intake and intestinal poisoning (pathological microorganisms in the intestines create amyloid-dissolving antigens). Amyloid is created, according to Katenkamp and Stiller, in wrongly nourished mesenchyme cells with increased protein production and formation of "pathologically fine fibrillary sclero-protein"; here we should remember that regeneration of the mesenchyme as well as that of pathological intestinal flora are best accomplished by raw diet.

In this connection it should be mentioned that in investigations at Harvard, an excessive amount of the aromatic amino acid methionine was discovered to favor the formation of nearly insoluble protein

bodies, and hardening of the inner surface of the arteries. The human need for methionine, which is found most abundantly in meat, egg and cheese protein, and which is three times as abundant in cow's milk as in breast milk, has been set much too high (at 930 mg/day) by the F.A.O. according to Kofranyl and is actually just 273 mg/day. Excesses of the amino acid tryptophane—which, as mentioned, is seven to ten times more richly present in meat and eggs than in plant sources—are, as proved on radioactive molecules, eagerly, consumed by cancer cells, which produce serotonin from it, block tryptophane metabolism and have been demonstrated to lead to a strong increase in cancer-producing ortho-aminophenols.

Bone atrophy (osteoporosis) is extraordinarily widespread among us; it begins in childhood, is almost considered a normal accompaniment of aging and is conceived as quickly increasing. Extensive scientific literature deals with the possible causes. Wachmann and Bernstein of the Department of Nutrition at Harvard University investigated all previous research results in the Lancet and arrived at the considered conclusion that a protein-rich, and especially meat-heavy diet plays the strongest role in the genesis of osteoporosis, more so even than denatured carbohydrates and fats. It is caused when the function of the bone system as a reservoir of basic minerals is continually overstrained. This corresponds to the fact that athletes who eat much meat are especially susceptible to arthrosis. Helas found among 20 professional football players who were observed for 18 years, 100% incidence of ankle arthrosis and 97.5% incidence of knee arthrosis. A negative lime balance is easily produced in experimental animals by increased protein supply, and they then die of disease associated with lime deficiency. The Walker group found in investigation among the Bantu tribe, that on an almost purely plant-source, low-protein diet there were no signs of calcium deficiency and no weakening of the bones.

Further work during recent years makes Ragnar Berg's acid-base theory, once set aside, again pertinent. The eminent importance of potassium and magnesium is emphasized by several authors. These two basic mineral substances are known to be deficient in an everyday diet rich in meat, eggs, cheese, fat, sugar and grains, but richly present in a full-value diet rich in vegetables and raw foods. One-sided chemical fertilization and refinement detract from these good effects. Also, animal protein-rich diet and alcohol consumption both hinder the absorption of magnesium from the intestine and correspondingly raise the magnesium requirement. The "magnesium deficiency syndrome." which has been prevalent now for 20 years, includes arteriosclerosis, high blood pressure, migraine, eclampsia, the leaching of calcium from teeth and bones, liver damage and disturbance of the neuro-muscular vessel system (Holtmeyer).

Strangely enough, the old Haig uric acid theory is also making a comeback. It seemed at one time to have been rendered invalid when no raised uric acid level was found in the diseases listed by Haig, except for gout. But now it has turned out that the reason for this was simply the introduction of new medicines for rheumatism, and that the evaluation of all uric acid tests on blood must be preceded by at least eight days during which anti-rheumatism medicines have been omitted. Uric acid has again assumed a position among the chief factors causing arterial blockage diseases—including rheumatism, kidney disease and cancer, as well as the amyloid formation, discussed above.

Naturally, the kidneys a re deeply involved in all the above factors from birth on in the child, and this has been especially true since the early '50s, when protein and salt-enriched baby foods were introduced. No wonder athletic medicine services in the U.S.A have had to treat an extraordinary number of kidney injuries and kidney breakdowns after athletic competitions and that the American Heart Association arrived at the conclusion that "almost all instances of these diseases"—arteriosclerosis, high blood pressure and coronary disease "are significantly related to the kidneys," and that, therefore, "more than half of the population die of kidney disease."

Only two more subjects still deserve a short mention, since they make the protein question particularly topical at this time.

First, environmental pollution. The individual has no or insufficient, effect on changing this situation. But what he can do is to put the defense and detoxification organs of his own organism in the best

possible condition first by detoxifying his body, and then by making it more powerfully reactive by dietary economy and raw food. Not everyone can supply himself with unsprayed and rationally fertilized food, but he can and must consider that meat and eggs have been far more contaminated since the 1960s than plant products—a result of conversion to industrial production. Anyone who fully understands the extent to which, for example, meal is treated will certainly forego these products. Besides pesticides, meat is treated with tetracycline, chloramphenicol, estrogen, tranquilizers, preservatives, plus metabolic toxins of the fattening process.

Second, and finally, what Sherman wrote two decades ago now applies to a much greater extent. "Feeding grain and potatoes to animals represents an enormous waste of nutritional production potential; and more than that, every person with a social and international sense of justice must become most deeply conscious of the fact that our excessive meat and egg consumption is a leftover from the times of colonial exploitation habits. If we ourselves do not see the provocative injustice in this situation for poorer classes and peoples, they themselves will certainly feel it with increasing intensity."

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